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BASF Plant Science

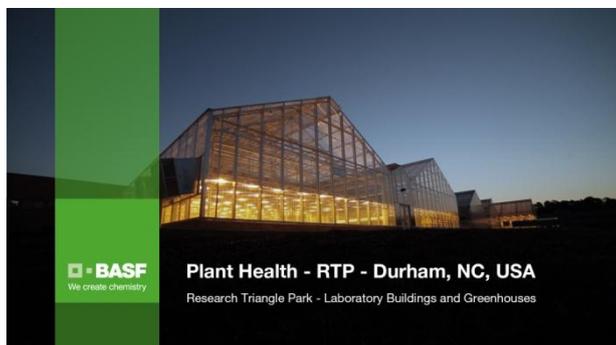
Research Triangle Park (RTP), Durham, North Carolina, USA

BASF Plant Science is one of the world's leading companies in plant biotechnology for agriculture. Our headquarters at the Research Triangle Park site near Raleigh, North Carolina, ensure our proximity to our main markets in North and South America.

With our global network of research sites in the United States, Canada, Belgium and Germany, we help farmers meet the growing demand for increased agricultural productivity as well as better nutrition. BASF invests more than €150 million per year to accomplish these goals.

(01) Laboratory buildings and Greenhouses – Research Triangle Park (RTP)

10/25/2013; 05:34; A1/A2: Atmo; FullHD



In RTP, BASF manages a total of 480,000 sq. ft. and employs approximately 950 people. RTP serves as headquarters for the North American activities of BASF's Crop Protection division as well as global headquarters for the Plant Science division. BASF has been a pillar of the North Carolina agricultural industry for the past decades, following the 1986 groundbreaking of the site.

BASF Plant Science is one of the world's leading companies providing innovative plant biotechnology solutions for agriculture. Today, about 950 employees are helping farmers meet the growing demand for improved agricultural productivity and healthier nutrition.



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(02) Greenhouse 5 – Research Triangle Park (RTP)

10/25/2013; 06:34; A1/A2: Atmo; FullHD

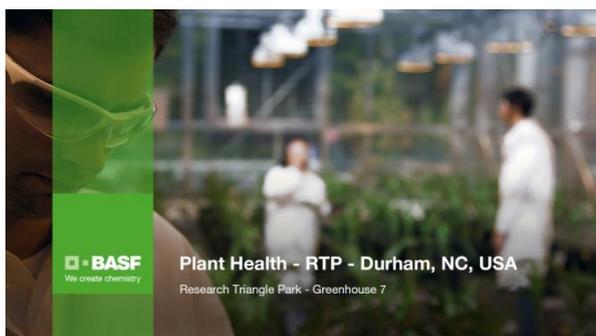


Transgenic soybeans are part of a project that works on making soybeans resistant against fungal pathogens like Asian soybean rust, which contributes to high economic losses in agriculture every year.

The Plant Management Scientists Daniela Loaiza and Andrew Rouse monitor the quality of plants and the timing of flower induction of soybean plants in the greenhouse. The plants will be grown to full maturity until seed harvest in the greenhouse.

(03) Greenhouse 7 – Research Triangle Park (RTP)

10/25/2013; 07:14; A1/A2: Atmo; FullHD



Fungal diseases in maize lead to high economic losses every year. BASF Plant Science is developing traits to make corn plants resistant to specific fungal pathogens.



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As part of the fungal resistant corn project donor corn plants are grown in the greenhouse. The ears of a non-transgenic corn plant are opened a few days after pollination to check the development of the immature embryos. These embryos are used later for transformation.

(04) Transformation Lab – Research Triangle Park (RTP)

10/25/2013; 06:26; A1/A2: Atmo; FullHD



The Research Triangle Park (RTP), North Carolina, is one of BASF's six major hubs for research and development in North America. It offers several laboratories and greenhouse space for diverse research and development projects.

Aparna Sri Vanguri, Senior Associate Scientist in the transformation group, examines young transgenic corn plants. Corn cells that have been successfully transformed may carry the desired new trait, such as resistance to fungal pathogens or herbicides.





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(05) Protein Analytics Lab – Research Triangle Park (RTP)

10/25/2013; 08:33; A1/A2: Atmo; FullHD



Experiments in the protein analytics lab support the development and characterization of traits. BASF Plant Science develops traits that make plants more resistant to fungal pathogens, tolerant to herbicides or produce higher yields.

Senior Scientist Helen Mu and Assistant Scientist Wasima Wahid examine a protein assay, which is done to quantify proteins in plant extracts.

(06) Chris Kafer – Senior Scientist (Fungal Resistant Corn Research)

10/25/2013; 03:26; A1/A2: Direct Sound; FullHD



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00:06

It's becoming increasingly clear that fungal diseases for farmers are becoming a bigger problem. It reduces a yield; it decreases the quality of the grain as well. So we have a multi-step approach and one of the first things that we do is called: gene discovery. And we will find plants that are naturally resistant to the fungi that infect corn and then we will test those in our greenhouse and we will find the underlying genes they give these plants resistance. Then after we discover those genes, we transfer them into corn which will then, we hope, give resistance to these pathogens. After that, after we find genes that work, we're going on what we call our optimization phase of the project where we take combinations of genes. Maybe we manipulate the genes a little bit and then put them back into corn to get a better effect.

01:06

Scientifically this project is interesting to work on, because right now they are very few options for corn growers to control these pathogens. Fungicides don't work; there is very limited genetic resistance available out there as well. So this provides a real tremendous opportunity for biotechnology to solve the problem. And we think it is only getting worse as our climate warms and as our population grows. I think it'll be fascinating to really look at how these pathogens and plants interact and then use that information to design a strategy to help maize resist attack by fungal pathogens.

01:47

The fungal resistance corn project is at very beginnings of its gene discovery activities. This means that we're currently screening a lot of different kinds of plants in our greenhouse to trying find these plants that are naturally resistant to pathogens. And we've also begun our process of gene discovery which means that we have identified some genes from our previous work that we're now putting into corn. And in fact we'll have our first genetically modified corn for testing.

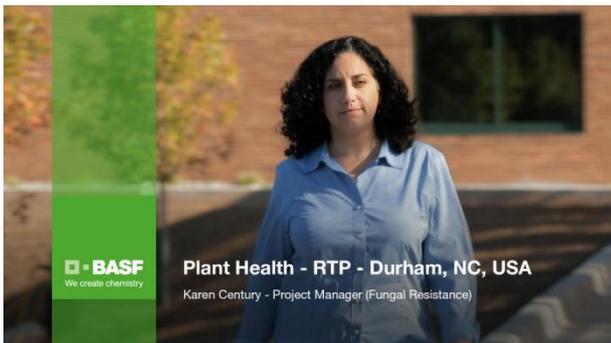


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(07) Karen Century – Project Manager (Fungal Resistance)

10/25/2013; 03:59; A1/A2: Direct Sound; FullHD



00:06

Fungal diseases have a tremendous negative impact on corn yield and the fungal diseases that we're focusing on, which are the corn stalk and ear rots, are estimated to cause well over one billion dollars in yield loss every year in the US alone. And these particular diseases have not been well controlled with fungicides or conventional breeding solutions. So they really offer an excellent market opportunity and target for our biotech approach.

00:37

BASF plant Science already has significant experience in this field with the launch of our soya-bean fungal resistance project earlier and so we really have developed a great deal of expertise in fungal biology and in engineering disease resistance in plants.

00:56

Corn growers suffer truly significant financial hit due to diseases that affect their crops and their yield which means financial impact for them. The diseases that we are focusing on, the stalk and ear rots, are especially important, because they cause a major economic damage in corn crops and because there really are no good solutions for control right now with chemistries or conventional breeding. So our ability to offer growers a solution



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with genetically engineered crops will have a tremendous impact on the corn grower's ability to preserve yield and maintain the best harvest.

01:38

BASF plant science is truly a global leader in providing plant biotechnology solutions for agriculture. We support farmers by helping them meet the growing demand for crops with increased yields, increased stress tolerance and better nutrition. And with our truly industry leading platform in gene discovery we've really specialized on discovering and developing complex traits which provide improved yields and just better quality crops, for crops such as corn, soya-bean and rice. And fungal resistance is actually one of BASF plant sciences three strategic pillars. And actually focusing on corn stalk and ear rots for this project is especially important because we're really going to provide a significant benefit to the farmer by filling this gap in a disease management program. And it also really complements our portfolio of chemical solutions for others corn diseases. So it's a really nice fit.

02:47

As we go into the future thus going to be even more demand for research in plant science. In this has largely to do with not just that growers needs, but a growing population which is putting a lot of strain on earth resources for producing enough food to feed everyone, for fiber, for feed, for everything. And so I only see the need is getting greater.



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(08) Stuart Kaplan – Senior Manager (Corn Development)

10/25/2013; 04:15; A1/A2: Direct Sound; FullHD



00:06

Plant science in the general sense is to provide enough food, enough feed and enough fiber for growing planet. When I was a young child and looking for something to do as an adult, agriculture just obviously seemed obviously to me, I'd like to say, I grew up on a farm, I always had a fascination with plants and so I grabbed it in that direction and I learned over time as a youngster, that for human beings to survive, we all depend on plants: either through direct consumption of plant tissue or the consumption of meat products produced from animals that can turn consumes plants. It's a fundamental biology of human existence quite honestly, so plant science will be with us as long as we are here.

00:54

Well we're doing a number of different things. We are looking at ways that we can infect corn plants artificially with a fungal inoculation that we have isolated from mother nature and so looking at ways to inoculate thousands of plants very efficiently at very precise times and then subsequently come back harvest those plants and evaluate the level of fungal infection. Because we are dealing with numbers that are very, very large, efficiency and safety are of paramount importance along with accuracy. So we had, we are looking at methods to infect, we are looking at methods to harvest, we are looking at methods to evaluate, we are also looking for the best pass and the best



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varieties of corn, if you will that, express these traits in useful way. So that's something else that we are doing here, we are doing this in multiple locations in the United States.

01:50

How much fungal resistance is necessary for there to be a product? And so we need to have methods which we're working on they will enable us to quantify, to measure how much resistance there is to a fungal infection in a corn plant. We don't have a methods thoroughly worked out yet, but we're working on any number of different methods and I'm comfort to work on a settle on a number of methods that will be safe, efficient and accurate. That's what our primary goal is: to get the safe, efficient and accurate methods that we can use in assessing fungal resistance in corn.

02:23

Well the biggest challenges we face in looking at fungal resistance: normally if you're looking at a response, at a genetic response in corn plant to something that we think we will increase yield, you're just looking really at corn plant, the corn varieties if you will. But here we're looking at an interaction between our corn plants and fungi and these are two very different organisms and the ability of a fungus to invade and infect and cause damage in a corn plant is a functional environment..

(09) Sheila Bhattacharya – Lab Manager (Plant Management)

10/25/2013; 02:01; A1/A2: Direct Sound; FullHD



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00:06

I'm the lab manager for the plant management which is actually the greenhouse manager position; but I also manage all the research projects for transgenic and non-transgenic crop pipeline for soya-beans and corn. I manage almost eighty research projects on in all over 70.000 square meters in the greenhouses that we have at BASF at our R&D location here.

00:34

This greenhouse has been built by Rough Brothers, which is a good research greenhouse company. So I worked very closely with them to add some features in the greenhouses that we had before to make it a better environment for growing the current crops that we have and for future. And also from a stewardship point of view this is designed from separating the transgenic and non-transgenic... We are going to add more efficiency components into these greenhouses pretty soon by end of this year. So we will have more automation and irrigation and fertilizer capabilities.

01:21

So I was a big part in designing, too the added features in this greenhouse 7, for particularly for growing corn and also this can be used for growing other crops as well for future research needs. So it has got a lot of structural changes like an adjustable light system, we have a better cooling system, better UV benefiting panels in this greenhouse. So we can have a very close environment compare to the outside for growing plants.

